

California Department of Transportation

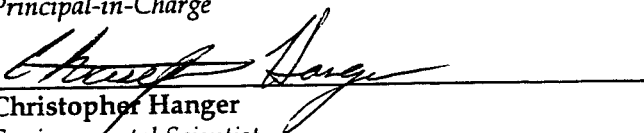
Corrective Action Plan  
*Hannon Ranch Site*  
*Brawley, California*

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## EXECUTIVE SUMMARY

Environmental Resources Management (ERM), on behalf of California Department of Transportation (Caltrans), has prepared this Corrective Action Plan (CAP) to identify and evaluate remediation alternatives regarding areas impacted with total petroleum hydrocarbons (TPH), volatile organic compounds (VOCs), and metals at the Hannon Ranch site in the City of Brawley, Imperial County, California. In addition, this CAP identifies and describes implementation procedures for the most cost-effective alternative.

The objective of the source removal is to reduce the mass of residual TPH-D, VOCs, and metals in soil, so that Caltrans may receive approval from the California Regional Water Quality Control Board (RWQCB) to construct a portion of Highway 111 upon areas which have been impacted at the Hannon Ranch site.

ERM has completed a review of the available data, including a soil and groundwater assessment report dated August 2000, issued by Professional Service Industries, Inc. (PSI, 2000). A copy of this report is included in Appendix A. Work completed to date includes groundwater and soil sampling and analyses, as well as a geophysical investigation. Results of the sampling events identified the following areas of concern:

- Total petroleum hydrocarbons as diesel (TPH-D) and associated specific petroleum hydrocarbon constituents, as well as VOCs, are present in the soil and groundwater in an area where two above-ground storage tanks (ASTs) are located. The two ASTs are used to store diesel fuel.
- Lead and zinc have been detected at concentrations above Preliminary Remediation Goals (PRGs) in an area that was formerly occupied by a dwelling destroyed by fire.

To address impacted source areas, the following three source removal alternatives were evaluated for overall effectiveness, implementability, and cost considerations.

1. No Action: This alternative involves taking no action to mitigate impacted source areas.

2. Excavation with Ex Situ Stabilization Asphalt Emulsification and Ex Situ Stabilization: This alternative consists of soil sampling, excavating, stockpiling, and treating impacted soils onsite. The application of an asphalt emulsifier would serve to bind the VOCs and TPH-D within the excavated soils. Concrete containing silicates would be added to the soils containing metals to stabilize the metals within the concrete matrix.
3. Excavation and Off-Site Disposal: This alternative consists of excavating impacted soils where constituents of concern exceed PRGs and RWQCB Soil Screening Levels (SSLs). Soils would then be shipped to an appropriate disposal facility.

The two active remedial alternatives evaluated are both effective in reducing chemical mass present in soils. However, due to the types of soil (mostly clayey silt, and clay) on the site, Alternative 2 (Excavation with Ex Situ Stabilization Asphalt Emulsification and Ex Situ Stabilization) may not be effective. Based on the results of a comparative analysis, Alternative 3 (Excavation and Off-Site Disposal) is recommended as an effective remedial technology that cost-effectively meets the objective of reducing the chemical mass in soils within the source areas. A comparative analysis of the alternatives evaluated and an implementation plan for the Excavation and Off-Site Disposal Alternative is provided within the body of this report.

Environmental Resources Management (ERM), on behalf of California Department of Transportation (Caltrans), has prepared this Corrective Action Plan (CAP) to identify and evaluate remedial alternatives to address areas of impact at the Hannon Ranch location (site) in the City of Brawley, Imperial County, California. The identified constituents of concern in the areas of impact are total petroleum hydrocarbons (TPH), aromatic volatile organic compounds (VOCs), and metals. Based on the evaluation of the remedial alternatives, this CAP identifies and describes implementation procedures for the most efficient and cost-effective alternative to remediate the areas of impact.

The primary objective of the selected remedial action is to reduce the mass of residual VOCs, TPH, and metals in soil, so that Caltrans may receive approval by the California Regional Water Quality Control Board, Region 7, District 11 (RWQCB) to construct a portion of Highway 111, which will utilize areas of the impacted site. This CAP was prepared in accordance with the RWQCB's, *Interim Site Assessment and Cleanup Guidebook* (RWQCB, 1996).

Following this introduction, the information presented is organized as follows. Site characterization information based on previous investigations is included in Section 2.0. An evaluation of the remedial alternatives considered is presented in Section 3.0, with a comparative analysis provided in Section 4.0. The design and implementation of the preferred remedial alternative is discussed in Section 5.0. A reference list of sources cited herein is provided in Section 6.0.

## 2.0

## **SITE CHARACTERIZATION**

This section provides characterization and historic information regarding the site and surrounding areas.

## 2.1

### **SITE LOCATION AND SETTING**

The site is located at 4002 Highway 111 approximately 2.5 miles south of the intersections of Main Street and Highway 111 in the City of Brawley, Imperial County, California (Figure 1). The site is located south of Schartz Road and east of Highway 111. A drainage ditch labeled as Lavender Canal on the 7.5 Minute, 1957 U.S. Geological Survey, Topographic Map borders the northern portion of the property. Site elevation ranges from 127 to 130 feet above mean sea level.

The surrounding properties are made up primarily of agricultural land. Many small drainage ditches (canals) traverse the area.

## 2.2

### **SITE GEOLOGY AND HYDROGEOLOGY**

The site is located in the Imperial Valley Groundwater Basin, part of the Colorado Desert Hydrologic zone (PSI, 2000). The Imperial Valley Basin covers an area of approximately 1,870 square miles. The basin is underlain by Quaternary Lake deposits (CDMG, 1962).

Data obtained from the site assessment and drilling logs indicate that the top 1 to 2 feet of soil consists of clayey silt. From approximately 3 to 5 feet below ground surface (bgs), the soil consists of a silty clay to clay layer. A water-bearing zone is encountered at approximately 5 feet, which appears to be approximately 1-to-2-feet thick consisting of silty sand material. Below groundwater, silty clay material exists from approximately 7 to 10 feet bgs. No lithological background was available for soils located below 10 feet bgs. No other water-bearing zone was encountered to a depth of 20 feet bgs (PSI, 2000).

## **SITE BACKGROUND**

Historical use of the site has been primarily storage and maintenance of agricultural equipment. There are two above-ground storage tanks (ASTs) containing diesel fuel located on the site, which are used to fuel agricultural equipment (Figure 2). The remnants of a burned-down dwelling, as well as an existing dwelling, currently used by Hannon Ranch personnel, are located on the site. Other structures located on site include a garage area used to store and maintain equipment, a large storage container located west of the ASTs, and two smaller shed like structures located on the northeast perimeter of the site.

## **SOURCE, NATURE, AND EXTENT OF CONTAMINATION**

Information provided in this section is primarily based on the available data regarding the nature and extent of chemical impacts at the subject site. These data are summarized in the copy of the PSI report provided in Appendix A.

### ***Source Areas of Chemical Impacts***

Based on an evaluation of past land usage, reported releases, and results/observations from site soil and groundwater investigations, the following source areas have been identified.

- Debris, ash and shallow soil near the burned-down dwelling; and
- Soil beneath two ASTs containing diesel fuel.

### ***Preliminary Soil Screening Criteria***

The data collected during the PSI investigation (PSI, 2000) were compared to conservative regulatory screening criteria, including:

- United States Environmental Protection Agency (USEPA) Region IX Preliminary Remediation Goals (PRGs) (USEPA Region IX, November 2000);
- USEPA Soil Screening Levels (SSLs) for chlorinated and semivolatile organic compounds (SVOCs) (USEPA, 1996); and
- RWQCB SSLs for TPH (RWQCB, 1996).

### 2.4.3

#### *Chemical Constituents in Soil*

Specific soil samples which contain one or more constituents in excess of the above-stated regulatory screening criteria are presented on Table 1. Based on the application of these criteria, two general areas of soil impact have been identified, as shown on Figure 3.

The following points summarize the analytical results with respect to the regulatory screening criteria:

- In the area of the burned-down building, total lead and zinc were detected in soil samples at concentrations exceeding PRG screening criteria (Figure 4). A Toxicity Characteristic Leaching Procedures (TCLP) value of 16 milligrams per liter (mg/l) was detected in sample H-4. If this data is representative of the ash-like debris from the burned-down building, this material may be classified as a Resources Conservation and Recovery Act (RCRA) hazardous waste and must be disposed of accordingly.
- In the area of the ASTs, low VOC concentrations have been detected sporadically in soil samples (Figure 5).
- In the area surrounding the AST locations, TPH-D compounds were detected at concentrations exceeding conservative regulatory screening criteria in soil samples (Figure 5).

### 2.4.4

#### *Chemical Constituents Present in Groundwater*

Groundwater was sampled during the PSI sampling event conducted in May of 2000. Groundwater was observed at approximately 5 feet bgs. Benzene was detected in sample ASTW-3 at a concentration of 1 micrograms/liters ( $\mu\text{g/l}$ ). Benzene was the only constituent in the groundwater above the MCL ( $1 \mu\text{g/l}$ ). Benzene was not detected in any other groundwater samples, nor was it detected in any soil samples located below groundwater.

### 3.0

## IDENTIFICATION AND ANALYSES OF REMEDIATION ALTERNATIVES

Various remediation alternatives were considered to determine those that could effectively satisfy the source removal objectives of the site. Alternatives that could satisfy these objectives were then analyzed in greater detail against site-specific constraints. The preferred remedial option was subsequently selected.

This section presents three remediation alternatives identified as potential approaches to address TPH-D-, VOC-, and metals-impacted soil at the site.

### 3.1

## ALTERNATIVE ACTIONS FOR SITE REMEDIATION

Two feasible removal alternatives were identified, based on initial screening of available remedial technologies. A No Action alternative was retained for evaluation as a baseline against which the degree of remediation and associated costs of the other alternatives could be compared. These three alternatives are discussed in the following sections.

#### 3.1.1

### *Alternative 1: No Action*

Soils and groundwater would be left undisturbed and construction would take place over the impacted areas of the site.

#### 3.1.2

### *Alternative 2: Excavation with Ex Situ Stabilization Asphalt Emulsification and Ex Situ Stabilization*

ASTs and the debris associated with the burned-down dwelling would be identified as containing any hazardous or toxic substances, classified as having to be disposed of in a regulated manner, and then removed from the site and disposed of properly before remedial activities take place. Following this, ash from the burned-down dwelling would be gathered in four, 20-ton containers lined with Visquene (polyethylene sheeting), and tested using Waste Extraction Test (WET) methods to determine if it is RCRA hazardous material. For the purposes of comparing alternatives, it has been assumed that the ash contains RCRA levels of contaminants, and will need to be disposed of by incineration. In addition, under this option TPH-D-, VOC-, and metal-impacted soils would be excavated and

incorporated into asphalt pavement or stabilized using cement and silicates or a similar binding compound. The asphaltic and stabilized soils would then be used as road base for the Caltrans, Highway 111 expansion project.

Per the RWQCB's request, an additional step will be added to the removal of impacted soils at the AST locations. Polyabsorbant pads would be used to absorb oil from the groundwater surface (approximately 5 to 6 feet below bgs) in the areas impacted by TPH-D, prior to backfilling the excavated area.

### 3.1.3

#### *Alternative 3: Excavation and Off-Site Disposal*

ASTs and the debris associated with the burned-down dwelling would be identified as containing any hazardous or toxic substances, classified as having to be disposed of in a regulated manner, and then removed from the site and disposed of properly before remedial activities take place. Ash from the burned-down dwelling would be gathered in four, 20-ton containers lined with Visquene and tested using Waste Extraction Test (WET) methods to determine if it is RCRA hazardous material. For the purposes of comparing alternatives, it has been assumed that the ash contains RCRA levels of contaminants, and will need to be disposed of by incineration. TPH-, VOC-, and metal-impacted soils would be excavated and disposed of offsite at a suitable hazardous waste facility. Clean backfill would be imported from an approved source to fill the excavated area.

Per the RWQCB's request, an additional step will be added to the removal of impacted soils at the AST locations. Polyabsorbant pads will be used to collect water from the perched zone (approximately 5 to 6 feet below bgs) in the areas impacted by TPH-D, prior to backfilling the excavated area.

A comparative analysis of the effectiveness, implementability, and cost of the three remedial alternatives considered is presented in this section. A qualitative comparison of these options is provided on Table 4.

## 4.1

*Effectiveness*

The No Action alternative does not meet the removal action objective of reducing the mass of constituents in soil and is, therefore, not an effective alternative.

Alternative 2 (Excavation and Asphalt Emulsification and Stabilization) does not actually remove chemical mass, but binds in a way that renders the soil less mobile and, as such, less of a risk to human health and the environment. However, given the predominantly clayey nature of the site soils, there is a relatively low level of confidence associated with the effectiveness of this alternative. During soil treatment proposed in Alternative 2, worker and community protection would be provided through air monitoring, in accordance with a site-specific HASP and the local air board requirements.

Alternative 3 (Excavation and Off-Site Disposal of Impacted Soil) is effective at reducing the mobility and volume of chemical mass at the site. Workers and the community would be protected during the short-term excavation efforts by implementing VOC control measures and conducting air monitoring (in accordance with site-specific HASP and local air board requirements).

## 4.2

*Implementability*

Both active alternatives for soil are implementable.

Alternative 2 is a reliable option, however it requires extensive equipment, and would likely entail a greater degree of disturbance (such as noise, traffic, and dust) to the general vicinity. In addition, the soils located at the site may not be well suited for the asphaltic and stabilizing processes.

Alternative 3 (Excavation and Off-Site Disposal) has the highest rating in this category due the minimal time and construction efforts required to achieve beneficial results.

#### 4.3

#### *Cost*

A low cost is associated with the No Action alternative. Of the two alternatives, Alternative 2 (Asphaltic Emulsification and Ex Situ Stabilization) is the apparent least expensive option at an approximate cost of \$122,200 (Table 2). However, as there is not a high level of confidence in the effectiveness of this option, a 40% contingency has been applied. Alternative 3 (Excavation and Off-Site Disposal) has a total associated cost of \$119,900 (Table 3). This includes a 10% contingency, as there is a high degree of confidence associated with the success of this alternative.

The costs presented herein are for comparison purposes only and do not include expenditures for debris removal, final waste disposal costs, or other remedial activities that might be required at the site.

#### 4.4

#### *Selected Alternative*

The two active remedial alternatives studied are both effective in reducing the toxicity, mobility, and volume of chemical mass present in the soil at the site. However, Alternative 3 is more readily implementable than Alternative 2. Disposal will quickly and effectively reduce the amount of exposure the workers and the community would have to endure during the remedial program. ERM believes that disposal of impacted soils would be a more effective alternative based on the soil types located at the site. Hannon Ranch soils are primarily composed of clays and silts for the first 5 feet bgs, therefore, Alternative 2 may not be a viable option due to the fact that clays and silts tend to be cohesive and as such may not mix well with asphaltic and stabilizing agents.

Based on the comparative analysis (Table 4), Alternative 3 is recommended as a proven, effective remediation technology that reliably and cost-effectively meets the objective of reducing the chemical mass in the impacted areas.

This section details the planning, site preparation, and other activities required to complete Alternative 3 (Excavation and Off-Site Disposal).

## 5.1

**PRE-PLANNING**

Final planning and initiation of the selected remedial alternative is expected to begin in April 2002.

The following information must be gathered and contacts established, prior to securing contractors or commencing field activities. This work will be conducted according to Caltrans' schedule of activities for the Hannon Ranch site, and will be provided by Caltrans upon request.

## 5.1.1

***Site Use and Access/On-Site Coordination***

The use of the site, including locations, treatment equipment, and staging area, will be carefully planned before commencing field activities. This planning will involve:

- Determining space requirements for equipment;
- Designing specific plans to properly characterize and remove or recycle existing structures and debris;
- Identifying possible locations for stockpiling materials, and for staging work vehicles and equipment; and
- Determining safety and security requirements, such as the need for fencing, treatment equipment, and security.

## 5.1.2

***Utilities***

Underground and overhead utilities within the proposed work areas will be located and documented to incorporate utility constraints into the excavation area shown on Figure 3, and to assess the need to support underground utilities. Initially, this will be done by contacting Underground Services Alert ("Call Before You Dig"), and contracting with a private utility locating service for a geophysical survey of the property.

### 5.1.3

#### *Health and Safety Program*

Based on the alternative actions presented, all contractors performing the work will adhere to Hazardous Waste Operations and Emergency Response (HAZWOPER) safety standards according to California Occupational Safety and Health Administration (Cal/OSHA), Title 8 Code of California Regulations (CCR), Section 5192. In addition to hazardous waste operations, safety contractors will also adhere to the Construction Safety Orders as necessary.

A site-specific Health and Safety (HASP) identifying potential workplace hazards and hazard abatement procedures will be developed and utilized during the project. The HASP will include the following:

- Potential physical and chemical hazards which may be associated with the site;
- Engineering controls, work practices, and personal protective equipment to abate identified hazards;
- Air monitoring procedures to protect against exposure to VOCs, metals, respirable dust;
- Training and medical surveillance requirements;
- Safe work practices around excavated areas and heavy equipment; and
- Emergency procedures, including emergency notification procedures, first aid, directions to the nearest hospital, and Caltrans notification.

Workers on this site must be 40-hour trained according to 8CCR 5192 and 29 CFR 1910.120, with subsequent 8-hour refresher training. They must also be active in their employer's medical surveillance program as required by 8 CCR 5192. Training for specific safety procedures or as necessary must also be included in the HASP such as respiratory equipment, electrical safety, lockout/tagout procedures, etc.

Contractors are required to implement all elements of the HASP. The HASP must be approved by Caltrans prior to the commencement of site activities.

On site, all workers must attend a pre-entry initial site safety meeting and acknowledge they have done so by signing the HASP. Beyond the initial pre-entry safety meeting, workers will attend daily tailgate safety meetings to discuss topics such as:

- Scope of work;
- Safety implications;
- Changing conditions;
- Previously identified safety concerns; and
- Issues at the discretion of the project manager or site safety officer.

If there are significant changes in the scope of work regarding requirements, site conditions, etc., the HASP will be amended, documented as such, and presented to all workers on the site. Signed acknowledgement of amendments is required.

## **5.2 EXCAVATION CONFIRMATION SAMPLING AND DISPOSAL OF IMPACTED SOILS**

### **5.2.1 AST Location**

Prior to the initiation of remedial activities in the AST location, ASTs will be decommissioned and removed from the site. After the site has been cleared, TPH-D and VOC impacted area (estimated as shown on Figure 3) will be excavated to an anticipated depth of approximately 6 feet bgs. The affected soil will be removed using an excavator or backhoe, operated by trained and qualified personnel. All excavated soil will be placed in a removable storage bin lined with, Visquene (polyethylene) sheeting. It is estimated that approximately 225 cubic yards of soil will be removed from the location shown on Figure 3.

After the excavation work is complete, polyabsorbant pads capable of retaining petroleum products from water are to be placed within the excavation on top of the groundwater. The pads will be changed regularly until the majority of any visible oil sheen has been removed. The used pads are to be placed in DOT- (Department of Transportation) approved, 55-gallon drums and labeled appropriately. The drums will then be disposed of at an appropriate, certified hazardous waste facility.

Approximately eight confirmation soil samples will be collected from the bottom of the excavation. Approximately seven confirmation soil samples will be collected from the sidewalls of the excavation, each between ground level and 5 feet bgs. Confirmation samples will be analyzed to determine concentrations of residual TPH and VOCs.

Affected soils will be removed until analytical results of confirmation samples indicate that residual concentrations of TPH-D and VOCs are below PRG and RWQCB SSLs guideline concentrations. The excavation will then be backfilled using certified clean imported soil. Three confirmation soil samples will be collected from each of the bins containing stockpiled soil. Stockpile samples will be analyzed to satisfy disposal facility waste-profile requirements.

### 5.2.2

#### *Burned-Down Dwelling Location*

Prior to excavation in the area of the burned-down dwelling, ASTs and the debris associated with the burned-down dwelling will be identified as containing any hazardous or toxic substances, classified as having to be disposed of in a regulated manner, and then removed from the site and disposed of properly before remedial activities take place.

Ash from the burned-down dwelling will be gathered in four, 20-ton containers lined with Visquene, and tested for California Assessment Manual (CAM) metals using Waste Extraction Test (WET) methods and TCLP. Any sample that exhibits greater than 10 times the Soluble Threshold Limit Concentration (STLC) for a specific metal will also be analyzed. This represents the minimum testing regimen that the contractor will employ to properly characterize the ash. Additional tests will be performed as necessary. If the ash contains concentrations of metals above RCRA levels, it will be disposed of by incineration, or properly treated and disposed of at a permitted, Caltrans-approved facility. Similarly, if the ash contains metals at concentrations in excess of State requirements, it will be disposed of at a properly permitted, Caltrans-approved facility.

After the area has been cleared of debris, the impacted soil (Figure 3) will be excavated. Anticipated depth of excavation will be approximately 6 inches bgs. The affected soil will be removed using an excavator or backhoe, operated by trained and qualified personnel. All excavated soil will be placed in a removable storage bin lined with, Visquene sheeting. It is anticipated that approximately 52 cubic yards of soil will be removed from this location.

Approximately six confirmation soil samples will be collected from the bottom of the excavation. Approximately five confirmation soil samples will be collected from the sidewalls of the excavation, each between ground surface and 6 inches bgs. Confirmation samples will be analyzed to determine concentrations of total lead and total zinc. Any samples which exhibit greater than 10 times the Soluble Threshold Limit Concentrations (STLCs) for lead (5 mg/kg) and zinc (250 mg/kg) will also be analyzed for soluble metals using the Waste Extraction Test (WET).

Affected soils will be removed until analytical results of confirmation samples indicate that residual concentrations of lead and zinc are within the range of background samples, considered to be represented by data from the remainder of the soil samples taken at the Hannon Ranch site.

The excavation will then be backfilled using certified clean imported soil. Confirmation soil samples will be collected from each of the contaminated soil stockpiles. Sample collected from the soil stockpiles as well as from the containers used to store the contaminated ash will be analyzed to properly characterize the waste and satisfy disposal facility waste-profile requirements.

### 5.3 **REPORTING**

A report will be prepared once appropriate analytical data and other documentation have been received regarding remedial activities. The report will include:

- Documentation regarding debris removal;
- Documentation concerning the removal the contaminated soils/ash and disposal to an appropriate waste facility;
- Volume of contamination removed from each of the impacted locations;
- Sample analyses results from the stockpiled soil and ash containers;
- On-site health and safety issues (if any) and air monitoring results;
- Laboratory reports and laboratory QA/QC data; and
- Rationale for requesting No Further Action for soil at the site.

## REFERENCES

- CDMG, 1962                      San Diego-El Centro Sheet, Geologic Map, Scale 1:250,000
- PSI, 2000                        *Hannon Ranches Soil & Groundwater Assessment*, Professional Service Industries (PSI) August 9, 2000
- RWQCB, 1996                   *Interim Site Assessment & Cleanup Guidebook*, – Preventing Groundwater Pollution: Assessing Your Site for Chemical Contaminants, California Regional Water Quality Control Board, Los Angeles and Ventura Counties Region 4, May 1996
- USEPA, 1996                    *Soil Screening Guidance: Technical Background Document*, EPA/540/R-95/128
- USEPA Region IX, 1999        Region IX Preliminary Remediation Goals (PRGs), Memorandum from S. J. Smucker, October 1999 (EPA website at [epa.gov/region09/waste/sfund/prg/](http://epa.gov/region09/waste/sfund/prg/)).